Dresdner Robin
Environmental Management, Inc.

43 Montgomery Street, Jersey City, New Jersey 07302-3892 • 201 432-9801 • (fax) 201 432-9171

195629

December 19, 1994

Mr. Thomas Quigley
NJDEP - Bureau of Case Management
401 East State Street
CN-028
Trenton, New Jersey 08625-0028

Re: Newark Ironbound Pool
Response to NJDEP Comments on
Remedial Action Work Plan for Design and Installation of
Subsurface Remediation System

Dear Mr. Quigley:

We are in receipt of your letter dated November 3, 1994 conditionally approving the Newark Ironbound Pool Remedial Action Work Plan for Design and Installation of Subsurface Remediation System (August 1994). On behalf of the City of Newark and the Hoechst Celanese Corporation (Respondents), the following is our response to the comments in your letter:

5.2.1 Design Basis

Comment - Address in the proposed treatment system and operations remedial action work plan the procedures for full access maintenance of wells located within the pool structure, including replacement of malfunctioning pumps or redevelopment of a clogged well.

Response - The proposed treatment system and operations remedial action work plan will describe access maintenance procedures for the remediation wells. The remediation well manholes have been designed to provide for maintenance of the wells after pool construction.

5.2.2 Well Design

Comment - Use of 6-inch well casing and 10-slot continuous wire wrap screen is acceptable if low pump rates (2 gpm) are maintained and screen length is doubled. If field conditions dictate shorter screen length, a 20 slot screen should be used to reduce entrance velocity of DNAPL into the well.

Response - The 10-slot size will not impede the flow of DNAPL into the well because the entrance opening is much larger than the small soil pore spaces through which the DNAPL is being transported while moving toward the well.

The entrance velocity into the wells will be maintained below industry standards (0.1 ft/sec.) during the remedial action. The entrance velocity will also be kept at levels that will facilitate transport of groundwater and entrained DNAPL and small soil particles through the filter pack and into the well. If the entrance velocity becomes too low, then the entrained materials will tend to drop out into the filter pack and maintenance costs will increase. Therefore, velocities will be adjusted based upon observations made during site remediation.

The DNAPL itself has been found to have a typical specific gravity just slightly higher than that of water. For this reason and for reasons which may relate to its natural drag-coefficient in water, the DNAPL entering at mid-height in a well does not readily settle out in the water column. In the case of a pumping well, it is easily entrained in the rising water column and carried upward.

It should be noted that 2 gpm is likely to be lower than the optimal pump rate for DNAPL recovery. However, given the screen length proposed in the Remedial Action Work Plan, pumping at higher rates should be achievable without adverse entrance velocities. The Respondents believe it is premature to specify a pumping rate.

Comment - To maintain structural integrity within the annular space, wells should be pressure grouted with cement or a cement/bentonite mix rather than a bentonite seal.

Response - We request that NJDEP reconsider its determination not to allow a bentonite seal based on the information presented below. The use of bentonite for seal construction is appropriate for this project to address the following concerns:

- settlement is anticipated;
- depth control is needed during seal construction;
- gravel pack installation over the constructed seals must be timely to avoid borehole collapse;
- seals will be installed below the water table;
- gravel pack infiltration by seal material must be avoided; and

- the seals should be capable of dynamic response to small soil movements in the substructure.

If pressure grout were to be utilized for seal construction, a high early Portland, Type III cement would be required for timely seal setup. Type III cement is specified under ASTM C150 (L.C. Urquhart, Civil Engineering Handbook) and is manufactured to a fineness of 99.5% passing a 325 mesh sieve (99.5% <0.0017 inches). Depth control of a pressure grout seal cannot be assured because of: (i) natural irregularities in the annular space between the well riser and the borehole; (ii) the potential for pressure grout to infiltrate sections of the borewall; and (iii) the liquid slurry form of the grout. In addition, the grout becomes embrittled and subject to cracking and may separate from the borewall when settlement and small soil movements occur because the grout cannot respond dynamically. Further, because of its fineness, Type III cement cannot meet infiltration control criteria that are industry standards (E.B. Williams, Fundamental Concepts of Well Design) and should be expected to infiltrate and damage the filter pack.

The bentonite proposed to be utilized on this project is in granulated form and, therefore, does not conflict with NJDEP constraints against the use of bentonite in pellet or slurry form. It will form a dynamic ("live") seal which is capable of responding to settlement or small soil movements without seal failure. When installed by trained personnel using appropriate tools and procedures, it can be installed at precisely measurable depths and overlain by subsequently installed filter pack material in a timely manner. It can be placed below the water table, will structurally support overlying filter pack material without shear or admixture, and will not damage an underlying filter pack by infiltration.

Bentonite has been successfully utilized by the geotechnical industry for the construction of downhole seals for decades. There are very specific protocols for the installation of downhole bentonite seals (J. Dunnicliff, Geotechnical Instrumentation For Monitoring Field Performance) and subsurface engineers have had continued success with these seals.

Unfortunately, when bentonite in the wrong form is used for seals, or when bentonite is not installed with correct tools and effective protocols, the resulting seals may not be functional. Briefly put, the problems that have been encountered with bentonite are not caused by the material itself, but rather by the people who install the material.

These problems can be eliminated with effective material selection, training, tools and procedures. As NJDEP representatives will be present to observe the installation of the wells, these problems can be avoided at the Newark Ironbound Pool Site.

The bentonite will be placed in solid form as packed granules using a Solinst Sand/Bentonite Injection System or equivalent (Solinst, Sand/Bentonite Injector Information and I. Thompson, et al, Placement of Bentonite Seals -- Using An Injector Device). This method is used at dam construction and other critical subsurface instrumentation projects as well as at multiple-screen well installation sites.

The solid bentonite granules, due to their size, will not infiltrate into the underlying filter pack. The bentonite granules are at an average mesh size of 8-12 and even the smallest bentonite particles associated with the granules are not less than 0.004 inches in diameter. This easily satisfies industry standard infiltration control criteria relative to the proposed 00 sand filter pack (E.B. Williams, Fundamental Concepts of Well Design).

The solid bentonite granules will adequately support the overlying filter pack. Such granules, at a void ratio of 1.0, are capable of supporting a confined bearing pressure in excess of 100 tons per square foot (T.W. Lambe and R.V. Whitman, Soil Mechanics). Even if the bentonite granule seal were to expand and equilibrate at a void ratio of 2.0 (more than the available inter-granule void space), the seal would be capable of supporting a confined bearing pressure many times the maximum that could possibly be exerted by the overlying filter pack.

The references listed in this response are attached.

6.0 Identification of All Areas Where Remediation Will Be Conducted

Comment - Any reuse of excavated soil is subject to NJDEP's "Management of Excavated Soils Guidance Document" (May 14, 1993) and a reuse proposal should be submitted for NJDEP approval.

Response - The handling and management of all excavated soils will be conducted consistent with the guidance contained in the May 14, 1993 "Management of Excavated Soils Guidance Document". However, the Respondents urge that the RAWP is the controlling document and that submission of a separate soil reuse proposal is unnecessary for soil reuse as subgrade backfill.

Soils excavated from the site will be stockpiled and covered on a bermed liner at the adjacent football field for reuse as backfill at the Pool site. If the excavated soils are unsuitable for use as backfill for engineering reasons, contain visible DNAPL, or there is excess excavated soil beyond the volume that can be backfilled, the soil will be classified and disposed of off-site. Neither off-site reuse of excavated soil nor on-site reuse, other than as subgrade backfill, are proposed at this time.

Any soil visibly contaminated with DNAPL will be segregated from other excavated soil, waste-classified and properly disposed of off-site. As the excavations at the site will be generally shallow (less than four feet bgs), and none of the extensive investigations at the site have identified DNAPL within this shallow fill zone, the excavation of significant volumes of DNAPL contaminated soil is not anticipated.

The reuse of excavated soils will not have an incremental adverse impact on groundwater because the soil would be returned to the same site from which it came and the site is relatively small. Thus, the pre-excavation soil and the backfill soil would have the same impact on ground water. Potential human receptors will not be adversely impacted since the backfill will be covered with impermeable surfaces in the same manner as all site soils as a result of the Pool construction.

10.2 Airborne Dust Control

<u>Comment</u> - The RAWP should discuss the degree to which the proposed action levels are protective of off-site residents, particularly with respect to known concentrations of contaminants in site soils. The RAWP should also include a site perimeter air monitoring plan, including corrective actions which will be implemented if action levels are exceeded.

<u>Response</u> - A risk assessment was performed for the excavation phase of the Ironbound Pool construction (EA Engineering Science and Technology, Inc., May 1988). A copy of the risk assessment was previously submitted to NJDEP. The focus of the risk assessment was the potential for fugitive dust emissions released during Pool construction activities to pose a risk to the general public living in the area. The risk assessment concluded:

> "Excavation activities on the Ironbound Recreation Center site are not expected to pose any significant carcinogenic or non-carcinogenic risk to the general population. The estimated total carcinogenic risk level is several orders of magnitude below the de minimus risk of 1×10^{-6} and the margin of safety between the RfDs of non-carcinogens and the estimated daily

intakes is also several orders of magnitude. The conservative assumptions that have been used throughout the risk assessment contribute a further margin of safety to these risk estimations."

In addition to the risk assessment, the Respondents conducted a wellhead air sampling program at the site to evaluate whether volatile and semi-volatile organic compounds of concern present in the soil and groundwater are likely to pose an air exposure risk. Air samples were collected at the head of three highly contaminated groundwater monitoring wells (MW-6, MW-11, MW-12) using personal air samplers and analyzed for eleven compounds of concern. The results of the air sampling program indicated that the only contaminant of concern present in the air samples at a concentration above laboratory detection limits was benzene which was present at a concentration of 0.02 ppm. This concentration is below the ACGIH threshold limit value and the OSHA Permissible Exposure Limit.

Based on the findings of the risk assessment and the wellhead air sampling program, the Respondents believe it is not necessary to monitor off-site emissions for specific soil contaminants.

However, the Respondents are prepared to monitor off-site emissions for inhalable particulates (PM-10). To implement such a monitoring program, the Remedial Action Work Plan is amended to add the following language:

> Section 4.0 - The National Ambient Air Quality Standard for PM-10 particulates over a 24 hour period is 150 ug/m^3 (40 CFR Part 50). If the construction activities were to last for 8-hours per day, then a modified 8-hour particulate emission criteria of 450 ug/m^3 at the fence line could be used to implement dust control measures. This modified short duration criteria is derived from the EPA 24-hour criteria of 150 ug/m^3 as shown below:
>
> $$\text{Modified 8-Hour Criteria} = \frac{150\ ug/m^3 \text{ X } 24\text{-Hours}}{8\text{-Hours}}$$
>
> $$= 450\ ug/m^3$$
>
> This approach is permissible under the EPA rules for ambient air emissions and is widely used for construction and industrial activities. For example, the Steel Structures Painting Council (\SSPC) guideline for containing debris generated during paint removal operations recommends the use of 450 ug/m^3 criteria if the work shift were to

last for 8-hours, provided that no emissions occurred from the work site during the remaining 16 hours (SSPC 92-07).

Section 10.4 - Fence line Air Monitoring: The ambient air monitoring for airborne dust will be conducted at the fence line using high volume samplers equipped with PM-10 heads. Such monitors are used to determine the airborne concentrations of particulate matter which is 10 microns or less in size. The monitor location will be selected by taking into consideration factors such as the prevailing wind direction and proximity to homes, playgrounds and businesses etc. Three PM-10 monitors will be used at the Ironbound Pool site on days when soil disturbance activities are being performed. These monitors will be stationed (i) inside the fence line near the entrance to the Recreation Center, (ii) at the Rome Street fence line and (iii) in the support zone area between the football field and the St. Charles Street. These monitor locations are identified in Figure 5. The fence line fixed station monitoring with PM-10's will be supplemented with real time ambient air monitoring at the fence line for respirable airborne particulates using a MiniRam.

In the event that the concentrations exceed the action level described in Section 4.0, the HSO will direct that the dust control measures described in Section 10.2 be implemented.

I trust that this letter satisfactorily responds to NJDEP's comments on the Remedial Action Work Plan for Design and Installation of Subsurface Remediation System.

Sincerely,

Dresdner Robin
Environmental Management, Inc.

William J. Staehle

cc: A. Zach, P.E., L.S. - Newark
G. Rowen, Esq. - Hoechst Celanese
E. Radow Sadat, Esq. - Cohen Shapiro

/15